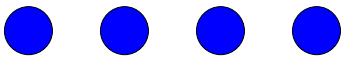
Repairhints

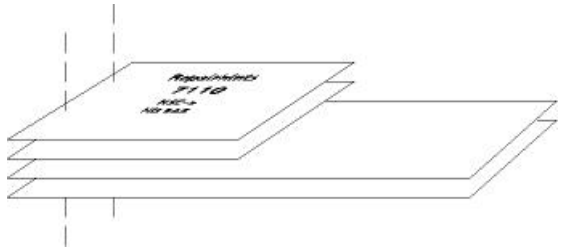
Service-Level 3 & 4

8310/6510

NHM-7/NPM-9



GENERAL



-How to use this document

Put the colored schematics behind this manual. Now you are able to follow the signalpathes with graphical layout and it is easier for you to find the components and measuring points.

-about Phoenix

When changing the phone mode with Phoenix, note that it is not possible to activate local mode directly from normal mode – change to test mode first! In normal mode the phone works as it would be supplied by the normal phone battery. In local mode the watchdog is disabled while in test mode only MCU-software is working without loading the PPM-file.
Using JBV-1 it is possible to change to local mode by suppling JBV-1 with +12VDC. If JBV-1 is supplied with +4VDC you have to change the phone mode manually with Phoenix.
When using service jig MJS-46 take care not to supply more than +12VDC – the jig will surely be damaged!
Always ensure that you are using Phoenix with the matching datapackage (see also next page). Further more ensure that the phone software corresponds to the used datapackage, otherwise Rx Channel Select Filter Calibration will not be possible.

-Component characteristics

Some components contain important data.
Several described steps are only practicable if you are able to reflash/ realign the phone and/or rewrite IMEI/SIMlock in certain cases. Please pay attention to separate notes.

-Broken balls, µBGA

All replaceable µBGA-components must be renewed after removing. Reflow with hot air fan is strictly forbidden!
Check soldering points, remove oxidated solderings (broken balls) carefully by enclosing few new solder before placing new components.
µBGA must be soldered only with NMP approved µBGA-rework machines (e.g. Zevac/OK International).
Only use recommended Fluxtype and an appropriate amount of it.

-PCB handling & cleaning

To avoid damages of PCB and/or components through electrostatic discharging, handle the module in ESD-suitable cases only. Always wear ESD-bracelets, which must be connected to earth bonding point.
Don´t make any loose wiring connections or do some other unqualified rework anywhere.
For cleaning use appropriate materials only, do not use scratching or rubbing tools.
Because of organic surface protection (OSP), cleaning must only be done with a lint-free cloth which may be moisten with DI-water. IPA or other solvent like ethanol should only be used to clean gold pads for spring contacts without affecting the surrounding copper layers.

-Realign after repair

Characteristics of replacement parts are different.
To prevent additional faults after repair (eg. low standby time, loosing network etc.) it is necessary to retune phone values after repair, but never try to cover a fault by tuning it out!

INTRODUCTION

IMPORTANT:

This document is intended for use by authorized NOKIA service centers only.

The purpose of this document is to provide some further service information for NOKIA 8310 and 6510 phones.
It contains a lot of collected tips and hints to find failures and repair solutions easily.
It also will give support to the inexperienced technicians.
Saving process time and improving the repair quality is the aim of using this document.
We have built it up based on fault symptoms (listed in "Contents") followed by detailed description for further analysis.
It is to be used additionally to the service manual and other service information like Service Bulletins. For that reason it does not contain any circuit descriptions or schematics.

All measurements are made using following equipment:

Nokia repair SW	: Phoenix version 03.60.00
Data package	: 6.00 for 8310, 4.00 for 6510
Nokia module jig	: MJS-46
Digital multimeter	: Fluke 73
Oscilloscope	: Fluke PM 3380A/B
Spectrum Analyzer	: Advantest R3162 with an analogue probe
RF-Generator / GSM Tester	: Rohde & Schwarz CMU 200

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Please state:
Title of the Document + Issue Number/Date of publication.
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Nokia GmbH
Service & Competence Center Europe
Meesmannstr.103
D-44807 Bochum / Germany

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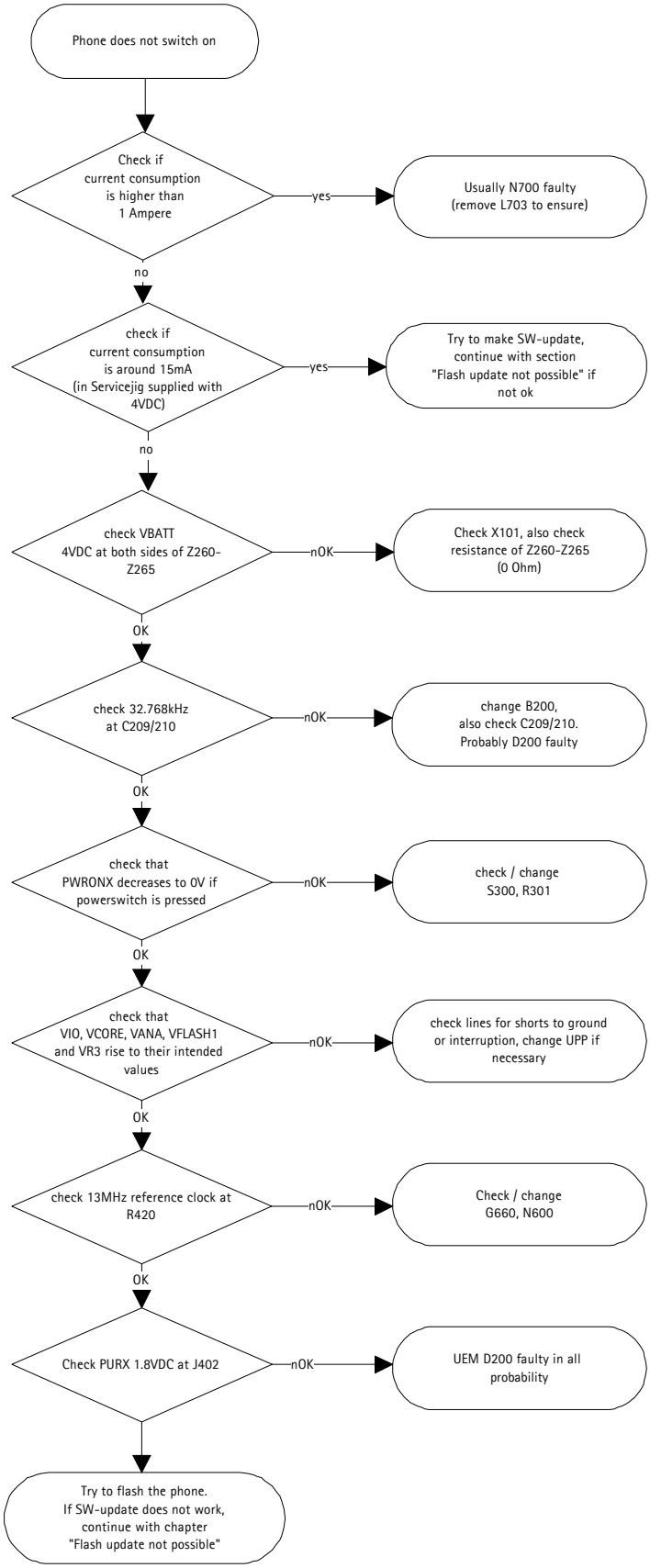
CHANGE HISTORY 20

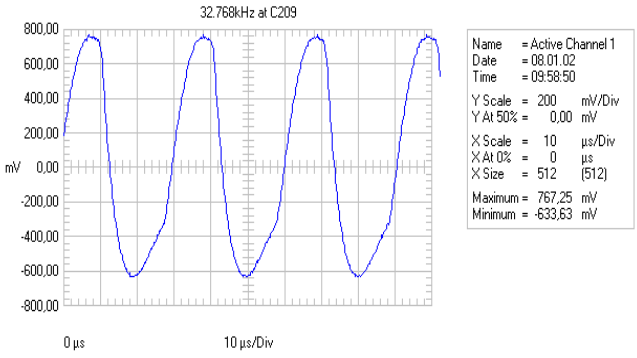
CHAPTER 1 PHONE DOES NOT SWITCH ON

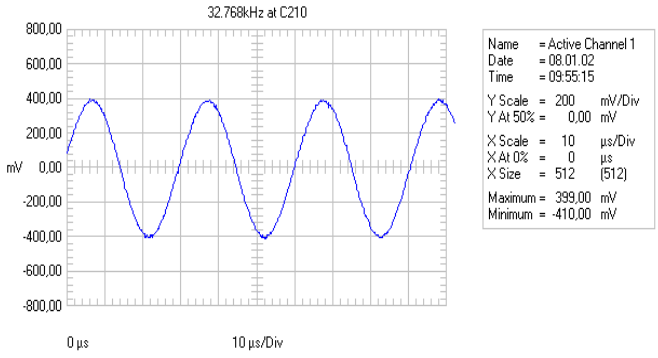

Phone does not switch on
Check if current consumption is higher than 1 Ampere
yes
Usually N700 faulty (remove L703 to ensure)
no
check if current consumption is around 15mA (in Servicejig supplied with 4VDC)
yes
Try to make SW-update, continue with section "Flash update not possible" if not ok
no
check VBATT 4VDC at both sides of Z260-Z265
nOK
Check X101, also check resistance of Z260-Z265 (0 Ohm)
OK
check 32.768kHz at C209/210
nOK
change B200, also check C209/210. Probably D200 faulty
OK
check that PWRONX decreases to 0V if powerswitch is pressed
nOK
check / change S300, R301
OK
check that VIO, VCORE, VANA, VFLASH1 and VR3 rise to their intended values
nOK
check lines for shorts to ground or interruption, change UPP if necessary
OK
check 13MHz reference clock at R420
nOK
Check / change G660, N600
OK
Check PURX 1.8VDC at J402
nOK
UEM D200 faulty in all probability
Try to flash the phone. If SW-update does not work, continue with chapter "Flash update not possible"

X101
- check mechanical appearance of battery connector. Change part if it is bent, soiled or corroded.

S300
- check mechanical appearance of powerswitch, change if necessary.
- check voltage at S300, 3.8VDC in case that switch is not pressed. If voltage is not measureable or too low especially check R301 and C312.
- if switch is pressed, voltage at S300 must decrease to 0V. Change switch if necessary.

B200
- check DC-voltages at C209 and C210, normally 0.5VDC. If voltages are not ok check C209/210 for shorts to ground. It also is possible that UEM D200 is defect.
- if DC-voltages are ok but no 32.768kHz signal is measurable at C209/210 change the crystal B200.
  Note that this signal must be always measurable if battery voltage is higher than 3.1VDC, even if phone is switched off! In this case amplitude of 32.768kHz is a bit lower (700mVpp at C209, 550mVpp at C210).





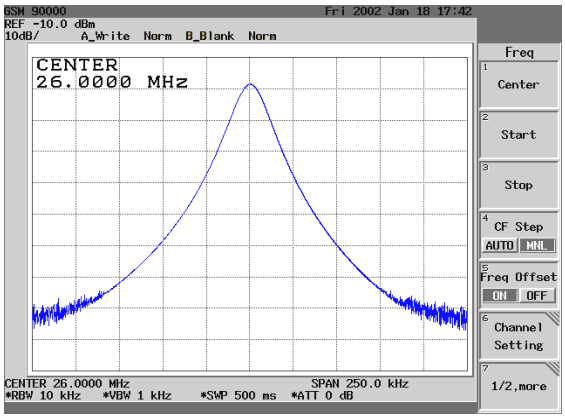
D200
- check that output voltage lines of UEM rises to their supposed values (VIO 1.8VDC at C207, VCORE 1.8VDC at C208, VANA 2.8VDC at C206 and VR3 2.8VDC at C227) after pressing the powerbutton. If no voltage is measurable at the different capacitors, check VBATT 4VDC at Z260/261/262/263/264/265. Also ensure that PWRONX-line is ok and SLEEPCLK-oscillator works properly. If only a single voltage line does not rise to its supposed value, check this line for shorts to ground. Probably it is necessary to change the UEM. Note that you have to rewrite IMEI and SIMlock data after changing this part!
  If all voltages are ok but phone does not switch on, try to flash the phone. In case of any failuremessage during flashing continue with the corresponding chapter on page 9.

D400
- check signals which are necessary for a working UPP such as VIO, VCORE, RFCLK, SLEEPCLK and PURX. If signals are ok try to flash the phone. In case of any failuremessage during flashing continue with the corresponding chapter on page 9.
  If flashing works but the phone still does not switch on, change UPP and reflash the phone once more.

D450
- in case that phone does not switch on while current consumption stays on 15mA (in Service jig supplied with 4VDC) this indicates that Flash D450 probably is empty. Try to make SW-update. If any failuremessage appears during flashing, try SW-update a second time. It also can be necessary to change D450. Note that in this case you have to rewrite IMEI, SIMlockdata and Product code, furthermore you have to run all RX/TX-tunings and energy management calibration!

G660
- check voltage at C662, 2.8VDC
- check signal of 26MHz reference oscillator at C660:

With the voltage of 2.8VDC at C662 the oscillator must be able to work on a frequency around 26MHz, else you have to change G660.

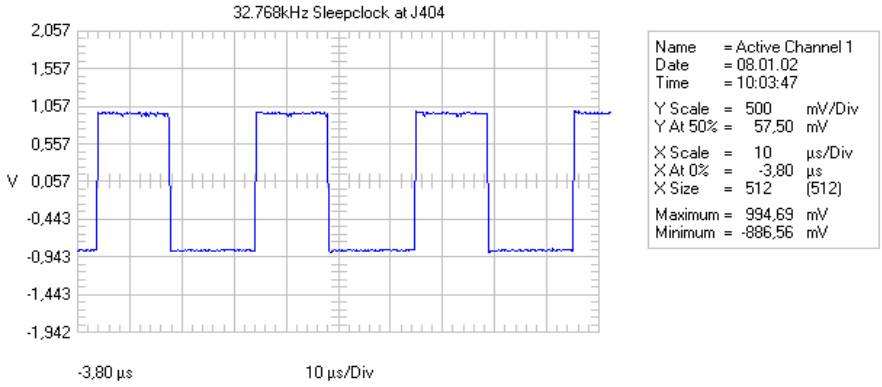


N700
- in case you suppose a defect poweramplifier N700 to be responsible for the fault, first of all check the current consumption of the phone. If current rises to more than 1 Ampere directly after connecting the phone to the servicebattery, remove coil L703 and check current consumption again. If current is ok now you have to change poweramplifier N700 with help of µBGA soldering machine and LGA rework kit LRK-1.

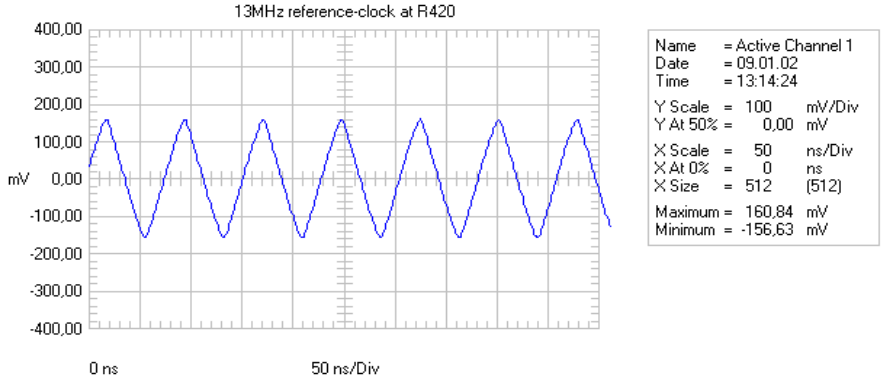
CHAPTER 2 PHONE SWITCHES OFF ITSELF

If this fault appears ensure that switching-off symptom is not the result of a too old phone software-version. SW-version should be 5.06 or newer!
Also check that symptom is not caused by an insufficient charged battery. In case of doubt retest the phone with a new or well charged battery. If this does not solve the problem, check the following:

- check mechanical appearance of battery connector X101. Change part if spring contacts are bent, soiled or corroded.
- check amplitude and frequency of 32.768kHz sleepclock-signal at J404, 1.9Vpp:



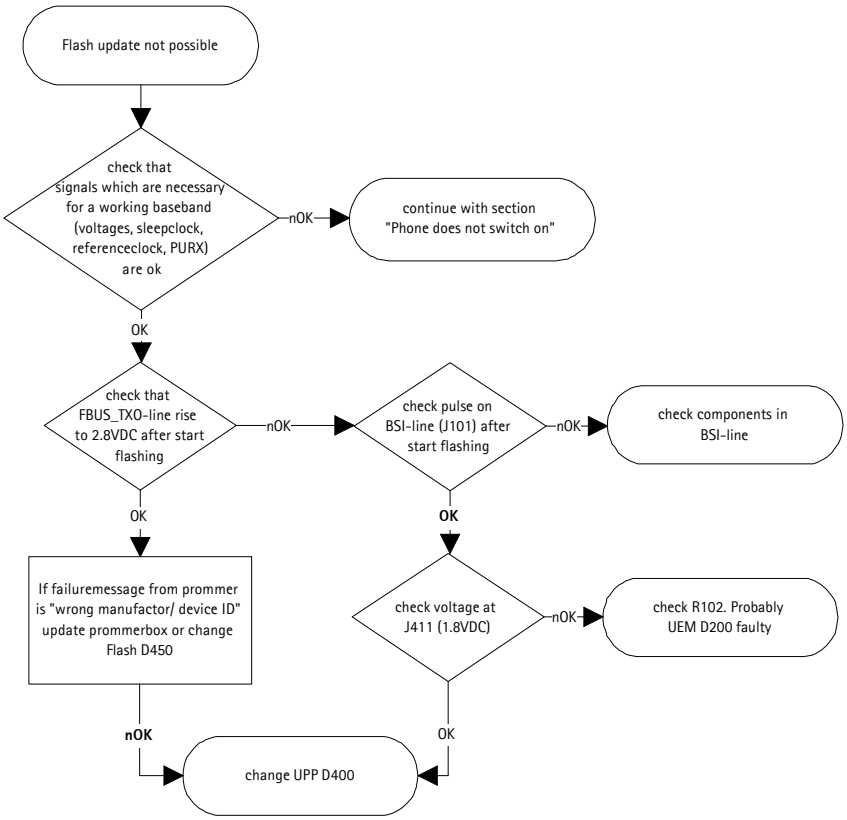
- check amplitude and frequency of 13MHz system clock at R420, 320mVpp:

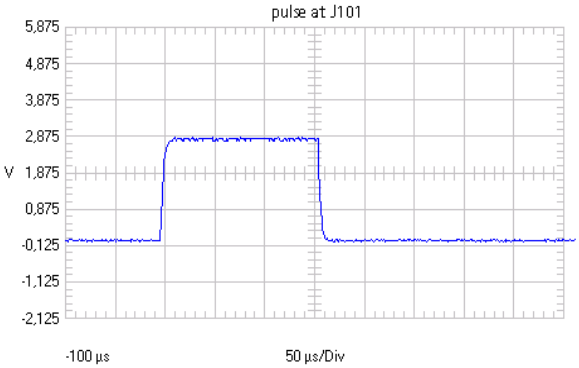


- try to calibrate TX-powerlevels. It is possible that poweramplifier N700 is defect so that the phone switches off if you try to tune the upper powerlevels because of too high current consumption.
- check solderings and resistance of R102 (100kΩ). It has been observed that solderings of this part were responsible for this fault in some cases, especially if phone switches off or resets after some minutes to some hours.
- it has been seen that in some cases UPP D400 was responsible for the mentioned fault. Remember that it is necessary to make SW-update after changing UPP, otherwise the phone will not switch on!

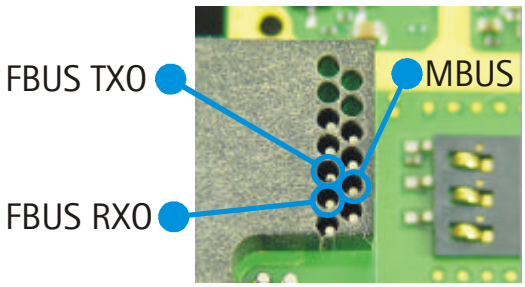
In case that phone switches off itself repeatedly after 30 seconds, this could be the result of a changed Flash D450 or UEM D200. Because of the data mismatch between both parts the watchdog will not be reset and the phone switches itself off.

CHAPTER 3 FLASH UPDATE NOT POSSIBLE


Flash update not possible
check that signals which are necessary for a working baseband (voltages, sleepclock, referenceclock, PURX) are ok
nOK
continue with section "Phone does not switch on"
OK
check that FBUS_TXO-line rise to 2.8VDC after start flashing
nOK
check pulse on BSI-line (J101) after start flashing
nOK
check components in BSI-line
OK
OK
If failuremessage from prommer is "wrong manufactor/ device ID" update prommerbox or change Flash D450
check voltage at J411 (1.8VDC)
nOK
check R102. Probably UEM D200 faulty
nOK
OK
change UPP D400



Name = Active Channel 1
Date = 18.01.02
Time = 13:41:28
Y Scale = 1 V/Div
Y At 50% = 1,875 V
X Scale = 50 µs/Div
X At 0% = -100 µs
X Size = 512 (512)
Maximum = 2,845 V
Minimum = -35,0 mV



D200
- remember that you have to rewrite IMEI and SIMlock data after changing UEM D200!

D400
- if it was necessary to change UPP D400 you have to make SW-update after reworking this part. Otherwise the phone will not switch on!

D450
- change Flash D450 in case that prommer box messages "wrong manufactor / device ID". Note that after changing D450 you have to flash the phone, rewrite IMEI, SIMlockdata and Product code. Furthermore you have to run all RX/TX-tunings and energy management calibration!

CHAPTER 4 CONTACT SERVICE FAULTS

With most of the selftests below it is possible to check the functionality of the lines between the several µBGAs, especially between UPP and UEM. If it was necessary to change UPP, remember to flash the phone, otherwise it will not switch on. In case that it was necessary to change the UEM, remember to rewrite IMEI and SIMlock data!

ST_PPM_VALIDITY_TEST
Usually this fault can be removed by making software-update to the latest version of MCU-software. In some cases it also can be necessary to change Flash D450.
Keep in mind instruction for changing Flash as described in NHM-7 Service-Bulletin 20!

ST_SIM_LOCK_TEST
In case of this fault first thing to do is performing software-update to the latest MCU-software. After that you have to rewrite SIMlock-data as described in NHM-7 SB 20.

ST_RF_CHIP_ID_TEST
This test checks that the ID-register of Hagar can be read and whether it contains reasonable value. Usually this is done by UPP via RF-bus. In most cases the RF-Chip itself is responsible for the fault but it also is possible that UPP or PCB is faulty.

ST_FLASH_CHECKSUM_TEST
This selftest calculates the checksum over Flash ROM areas which then is compared to precalculated checksum in Flash header. If checksums are the same selftest is ok, otherwise the selftest fails. In this case change Flash D450.

ST_SIM_CLK_LOOP_TEST
This function tests the connection of SIMCLK and SIMIODATA signals beetween UPP and UEM. This test also requires that SIMIOCTRL-signal can be set to high state. If lines are ok the result is ST_OK, if there is an interruption the result is ST_NO_SIGNAL and if the lines have short circuit to ground the result is ST_SHORT_CIRCUIT.

ST_SIM_IO_CTRL_LOOP_TEST
This selftest checks the connection of SIMIOCTRL and SIMIODATA lines between UPP and UEM. This test also requires that SIMCLK signal state can be switched. If the lines are ok the result is ST_OK, in case the lines are interrupted the result is ST_NO_SIGNAL.

ST_SLEEPX_LOOP_TEST
With this selftest the connection of SLEEPX and SLEEPCLK-lines between UPP and UEM can be checked. UEM_V2 or later required! If the lines are ok the result is ST_OK, if there is no connection the result is ST_NO_SIGNAL.

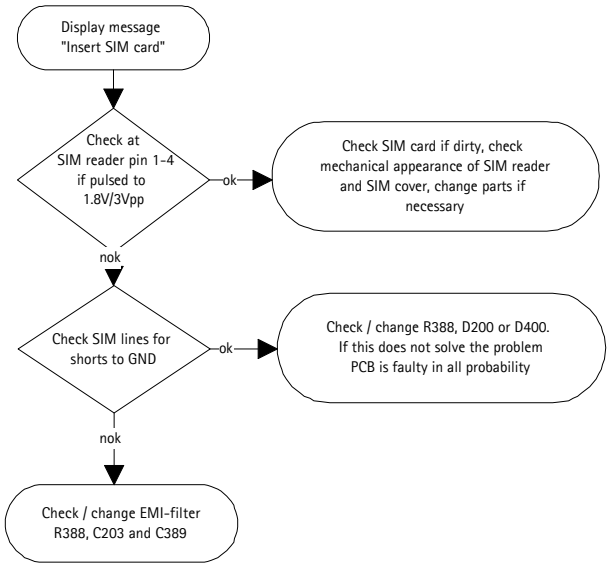
ST_TX_IDP_LOOP_TEST
This function checks the connection of TXIDP and RXIDP signals between UPP and UEM (only supported with UEM_V2 or later). If lines are ok the result is ST_OK, in case the lines are interrupted the result is ST_NO_SIGNAL and if the lines are short circuited to ground the result is ST_SHORT_CIRCUIT.

ST_TX_IQ_DP_LOOP_TEST
This selftest checks the TXQDP and RXQDP-lines between UPP and UEM (also here UEM_V2 or later required). If lines are ok the result is ST_OK, in case the lines are interrupted the result is ST_NO_SIGNAL and if the lines are short circuited to ground the result is ST_SHORT_CIRCUIT.

ST_MBUS_RX_TX_LOOP_TEST
With this selftest the connection of MBUSRX and MBUSTX-lines between UPP and UEM can be checked. If connections are ok the result is ST_OK, if there is an interruption the result is ST_NO_SIGNAL.

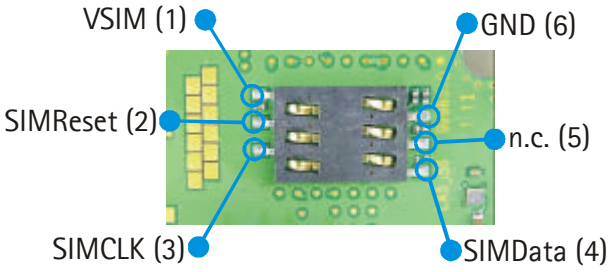
ST_EAR_DATA_LOOP_TEST
This function checks the connection of MICDATA and EARDATA-signals between UPP and UEM. In case the lines are ok the result is ST_OK, if the lines are interrupted the result is ST_NO_SIGNAL and if the lines are short circuited to ground the result is ST_SHORT_CIRCUIT.

CHAPTER 5 SIMCARD-FAULTS


Display message "Insert SIM card"
Check at SIM reader pin 1-4 if pulsed to 1.8V/3Vpp
ok
Check SIM card if dirty, check mechanical appearance of SIM reader and SIM cover, change parts if necessary
nok
Check SIM lines for shorts to GND
ok
Check / change R388, D200 or D400. If this does not solve the problem PCB is faulty in all probability
nok
Check / change EMI-filter R388, C203 and C389

X386
In case that phone messages "Insert SIM card" on LCD, first of all check mechanical appearance of SIMcardreader X386. If contact springs are bent, soiled or corroded you have to change the SIMreader.

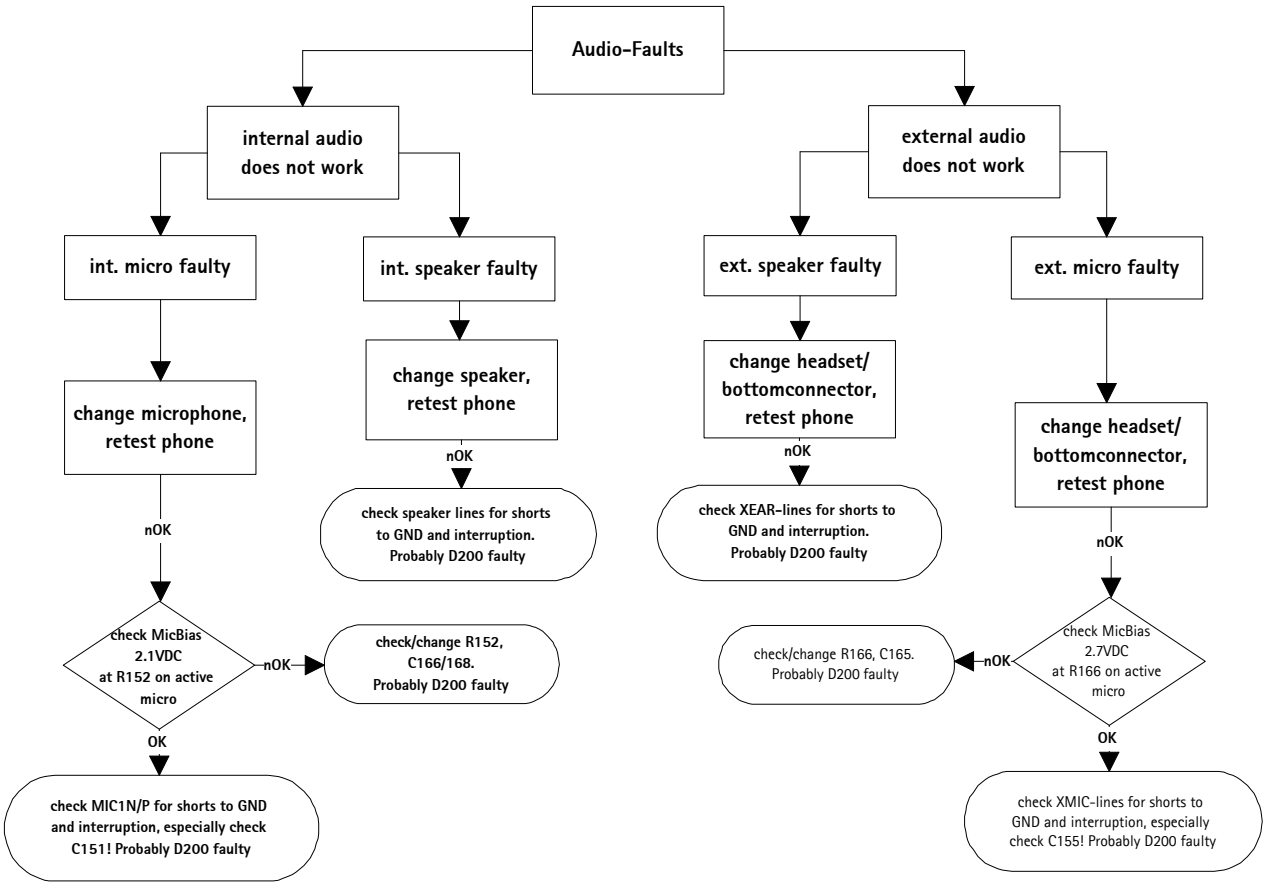
R388/D200/D400
If mechanical appearance of SIMreader seems to be ok but fault persists, check with an oscilloscope if SIMlines at SIMreader pin 1-4 are pulsed to 1.8Vpp / 3Vpp after switching on the phone as shown in the chart below. Signals are slightly different between pin 1-4 but the amplitude always is 1.8Vpp / 3Vpp.



In case that the above mentioned signal is not measurable at one or more SIM lines, check SIM lines for shorts to ground. Resistance of SIMdata- and VSIMline normally is > 200kΩ, resistance of SIM reset- and SIM clock line normally is ~ 4.5MΩ. If resistance of any line is not ok check parts the SIM lines consists of (R388, C203, C389).
In case that resistance of all lines is ok but fault persists, EMI-filter R388 may have internal interruption. Change part and retest the phone. It also is possible that UEM D200 or UPP D400 are responsible for this fault. Remember that it is necessary to flash the phone after changing UPP as it is necessary to rewrite IMEI and SIMlock data after changing UEM!

CHAPTER 6 AUDIO-FAULTS

In case of any audiofault in the phone, the best way to define the fault is to make a call with the defect phone to a proper working one. In case that you can hear the speech of the proper working phone in the defect one but the other way round the speech of the defect phone is not audible in the proper working phone you know that the internal microphones signalpath is responsible for the fault.
Of course you can use the same procedure to check the external audiopathes XMIC and XEAR.


Audio-Faults
internal audio does not work
external audio does not work
int. micro faulty
int. speaker faulty
ext. speaker faulty
ext. micro faulty
change microphone, retest phone
change speaker, retest phone
change headset/ bottomconnector, retest phone
change headset/ bottomconnector, retest phone
nOK
nOK
nOK
nOK
check speaker lines for shorts to GND and interruption. Probably D200 faulty
check XEAR-lines for shorts to GND and interruption. Probably D200 faulty
check MicBias 2.1VDC at R152 on active micro
nOK
check/change R152, C166/168. Probably D200 faulty
check/change R166, C165. Probably D200 faulty
nOK
check MicBias 2.7VDC at R166 on active micro
OK
OK
check MIC1N/P for shorts to GND and interruption, especially check C151! Probably D200 faulty
check XMIC-lines for shorts to GND and interruption, especially check C155! Probably D200 faulty

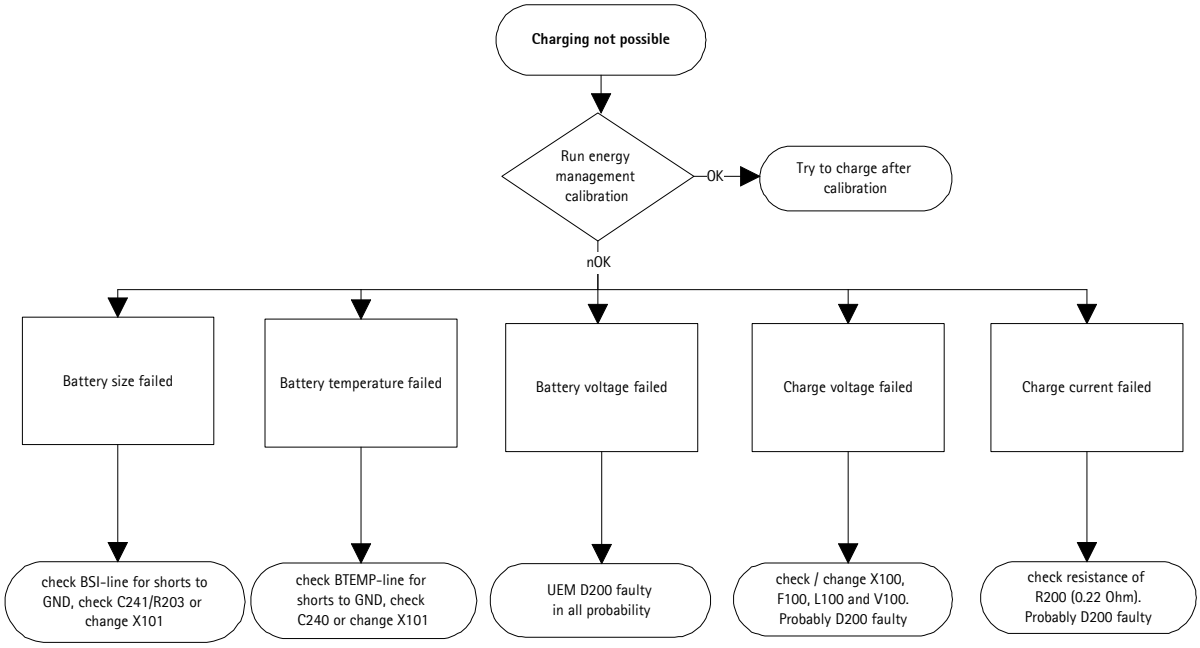
I009 bottomconnector
- check mechanical appearance of bottomconnector I009 in case that internal microphone does not work, external audiopath seems to be interrupted or headset is not recognized. Retest phone with new connector in case of doubt.
  Also ensure that contact pads for connector on PCB are clean.

I005 speaker
- check mechanical appearance of speaker. Change part if spring contacts are bent or soiled. Resistance of speaker normally is 30Ω. Also ensure that contact pads on PCB are clean.

C151/C155
- check resistance of the double capacitors, which normally is > 20MΩ. Both parts have tendencies to leak and often are responsible for missing uplink audio (C151 in case of internal -, C155 in case of external audio faults).

D200
- in case that you suppose a faulty UEM D200 to be responsible for the audio-fault, do not forget to rewrite IMEI and SIMlock data after rework of this part!

CHAPTER 7 CHARGING FAULTS


Charging not possible
Run energy management calibration
OK
Try to charge after calibration
nOK
Battery size failed
Battery temperature failed
Battery voltage failed
Charge voltage failed
Charge current failed
check BSI-line for shorts to GND, check C241/R203 or change X101
check BTEMP-line for shorts to GND, check C240 or change X101
UEM D200 faulty in all probability
check / change X100, F100, L100 and V100. Probably D200 faulty
check resistance of R200 (0.22 Ohm). Probably D200 faulty

First thing you should do in case that charging of battery is not possible is to run energy management calibration. Note that calibration only works with JBV-1. In Service jig it is not possible because of missing bottom connector I009.

Also check whether charging is only from time to time not possible or if charging does not work permanently. In case that fault appears from time to time only, especially check spring contacts of bottom connector I009 and battery connector X101 if bent, soiled or corroded. Also make sure that contact pads for bottom connector on PCB are clean. If necessary clean PCB with an appropriate amount of alcohol. Do not use any scratching or rubbing tools!

To ensure function of the phone run energy management calibration whenever a part has been changed in the charging circuit!

I009, X101
- check mechanical appearance of battery connector and bottom connector, change parts if bent, soiled or corroded. also ensure that contact pads for bottom connector on PCB are clean.

F100
- check resistance of fuse, must be 0Ω

C241
- perform energy management calibration. AD-value for battery size normally is ~ 1000. If you get no reasonable value for BSI, check resistance of BSI-line to ground, which normally is around 600kΩ. In most cases C241 is responsible if resistance is too low.

V100
- check that V100 does not cause a short circuit to ground. Resistance of VCHAR-line to ground normally is ~ 2.8kΩ

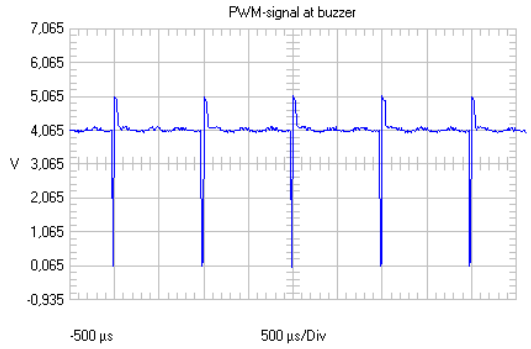
D200
- if you have change UEM D200 to repair the charging fault, remember that it is necessary to rewrite IMEI and SIMlock data after rework of this part.

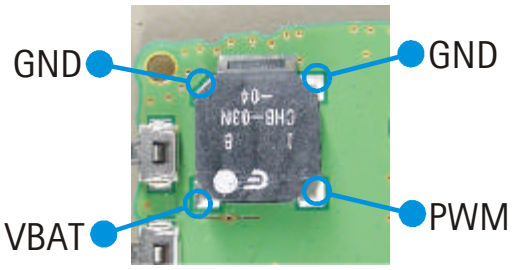
CHAPTER 8 USER INTERFACE FAULTS

Display faulty
- change displaymodule I004 to check if it is responsible for the fault
- check mechanical appearance of displayconnector X300, change part if necessary
- if fault persists check VIO 1.8VDC and VFLASH1 2.8VDC, both measurable at double capacitor C303 also check VOUT 8.1VDC at C301/302 which is generated by the displaymodule.
- If DC-voltages are ok but display does not work, probably UPP D400 faulty. Note that you have to make SW-update after changing UPP, otherwise the phone will not switch on!

Display- and keyboardillumination faulty
- check VBAT 4VDC at R304 and R307
- check that voltage at V300/301 pin 5/6 decreases from 3.5VDC to 3VDC if illumination gets active, check R305 (470Ω) or change V300/301 if necessary. It also is possible that UEM D200 is faulty. Remember to rewrite IMEI and SIMlock data after changing this part!
- in case of faulty keyboardillumination also check mechanical appearance and solderings of board to board connector X303

Buzzer faulty
- ensure that fault is no result of too old phonesoftware. SW-version should be 5.06 or newer.
- if SW-update does not solve the problem, activate buzzer with Phoenix in menu "Maintenance/Testing/Audio Test". Check VBAT 4VDC and PWM-signal coming from UEM at buzzer, change buzzer if necessary
- it also is possible that UEM D200 is defect. Remember to rewrite IMEI and SIMlock data after changing this part!





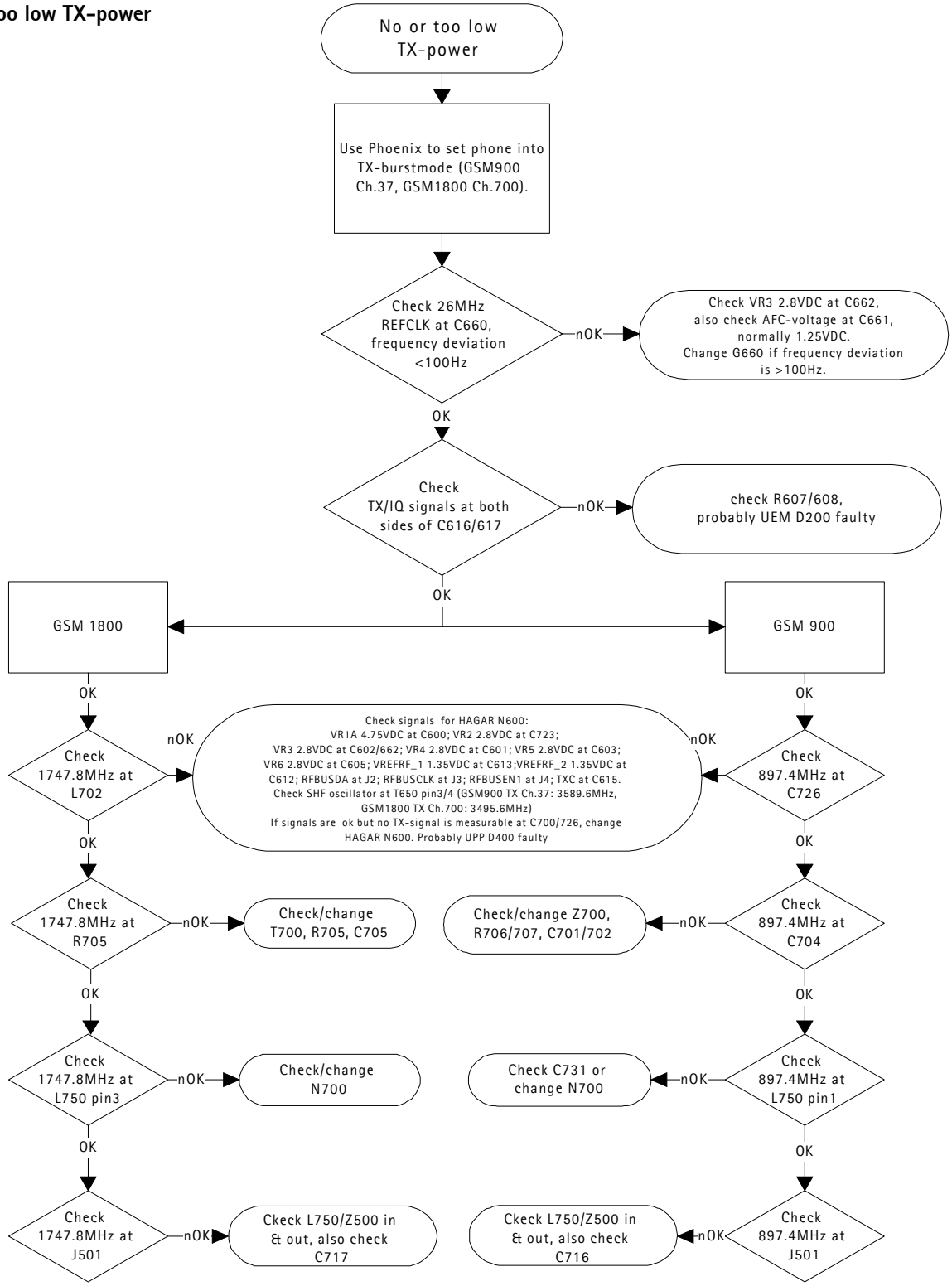
Vibramotor faulty
- as in case of faulty buzzer ensure that fault is not the result of too old phonesoftware, make SW-update if necessary
- check spring contacts of vibramotor if bent or soiled, change vibramotor if necessary
- if fault persists UEM D200 faulty in all probability. Remember to rewrite IMEI and SIMlock data after changing this part!

Keyboard faulty
- if only a single key does not work displaymodule I004 is faulty in all probability. Exchange displaymodule and retest the phone
- in case that a whole row or column of keys (e.g. 2-5-8-0) does not work this also may be caused by a defect displaymodule, but it is more likely that EMI-filter Z301 interrupts the keyboardlines or UPP D400 is faulty. Also check solderings and mechanical appearance of board to board connector X303, change part if necessary. Note that you have to flash the phone after changing UPP, otherwise the phone will not switch on!

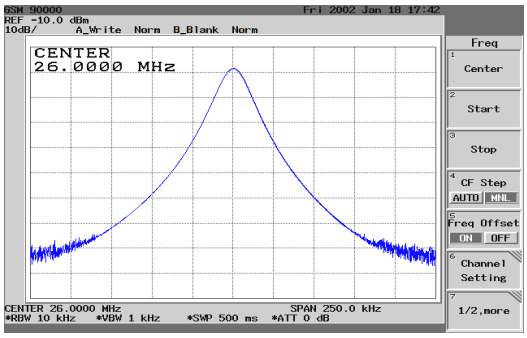
CHAPTER 9 NO SERVICE

In case that this fault occurs with your phone, the first thing you should do is to calibrate RX/TX-values of the phone. If for example TX-power is not measurable or too low, continue with the chapter below. If the receiver does not work, continue with the corresponding chapter on page 17. If RX and TX do not work check parts which are needed for both signalpathes (e.g. oscillators G650/660, Hagar N600 or UPP D400).

No or too low TX-power

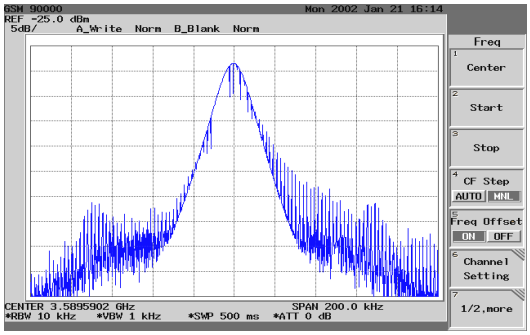


G660
- set phone with Phoenix on local mode
- check VR3 2.8VDC at C662. With only this voltage the oscillator must be able to work on a frequency of 26MHz, Otherwise you have to change G660. Check signal at C660:



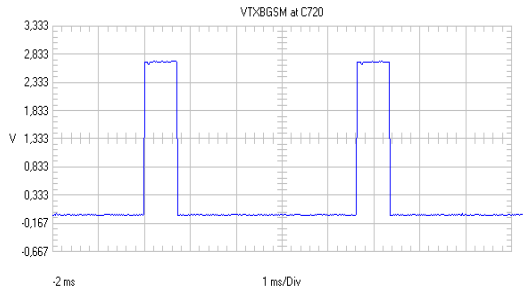
AFC-voltage at C661 normally is 1.25VDC, but may vary between 0.05VDC and 2.5VDC.
If frequency deviation of G660 is >100Hz it is necessary to change the oscillator!

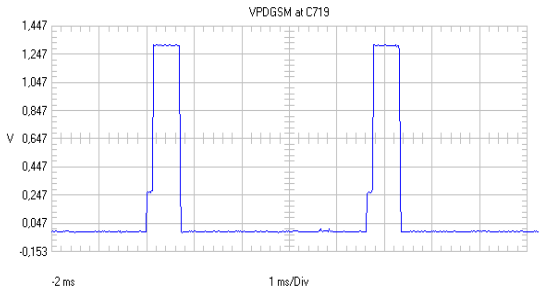
G650, C653
- to check if the SHF-oscillator G650 is working you have to activate with Phoenix e.g. TX-burstmode Ch.37. After that check signal (3589.6MHz) at T650 pin 3 and 4 as shown below:



If no signal is measurable at T650 check VR7 2.6VDC at C650. If OK, set span of your analyser to e.g. 250MHz to check if the oscillator works on any other frequency as on the supposed. If this is the case check control voltage at C652 which normally is 2.1VDC on channel 37. In case of noise on the control voltage especially check C653 (tendency to leak).
If the oscillator does not work at all, change G650 and retest the phone.

N700
- set phone with Phoenix to local mode and activate TX-burstmode Ch.37 (Ch.700 for GSM1800). Data in parethesis are mentioned for GSM1800.
- check VBATTRF 3.9VDC on both sides of L703
- check incoming RF-signal of 897.4MHz at C731 (1747.8MHz at R705)
- check VTXBGSM 2.8Vpp at C720 (VTXBDCS 2.8Vpp at C714) and VPDGSM 1.3Vpp up to 2.5Vpp depending on TX-power-level at C719 (VPDDCS 1.2Vpp up to 2.1Vpp at C718):



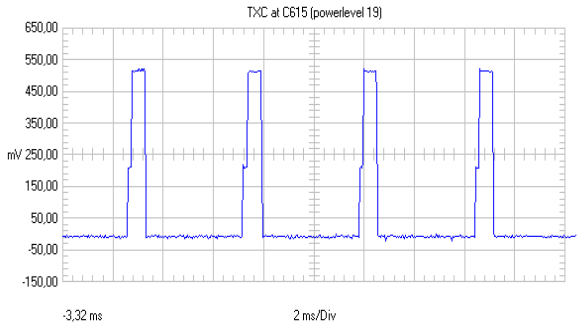


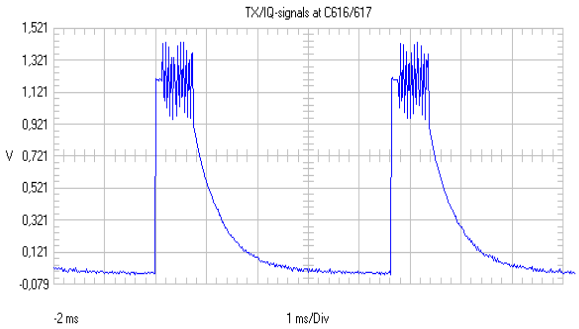
- check VTXLOGSM at R709. Signal/amplitude is the same as VTXBGSM, but it is only present in PA-free and -low mode.

If the above mentioned signals are ok but no or too low TX-power signal is measurable at L750 pin 1 (pin 3 in GSM1800), it is necessary to change the poweramplifier N700.

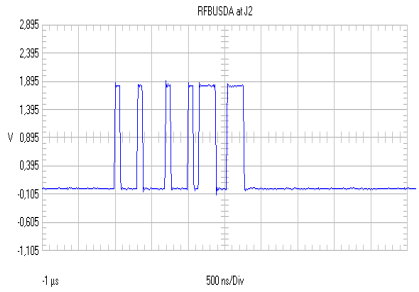
N600

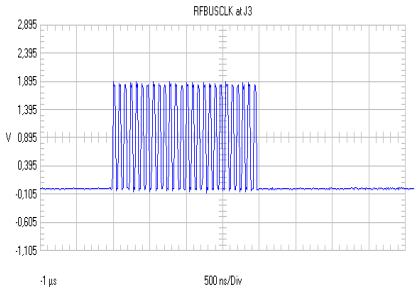
- set phone with Phoenix to local mode and activate TX-burstmode Ch.37 (Ch.700 for GSM1800).
- check 26MHz reference clock at C660, refer to signal shown on page 14.
- check VR1A 4.75VDC at C600, VR2 2.8VDC at C723, VR3 2.8VDC at C662, VR4 2.8VDC at C601, VR5 2.8VDC at C603, VR6 2.8VDC at C605 and VR7 2.8VDC at C650
- check with an oscilloscope TXC at C615 (0.5Vpp – 2.1Vpp depending on TX-powerlevel), also check TX/IQ-signals at C616/617:

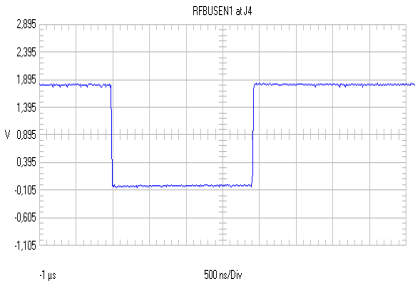




- check with an oscilloscope RFBUSDA at J2, RFBUSCLK at J3 and RFBUSEN1 at J4:







- check signal of SHF-oscillator at T650 pin 3 and 4 (3589.6MHz/Ch.37, 3495.6MHz/Ch.700). Refer to signal shown on previous page.

If these signals are ok but no TX-signal is measurable at C726 (C700 in GSM1800), you have to change Hagar N600. Unfortunately TXP and Hagar reset, which also are necessary for a working Hagar are not checkable because of missing testpoints. Change UPP D400 in case of doubt and retest the phone.

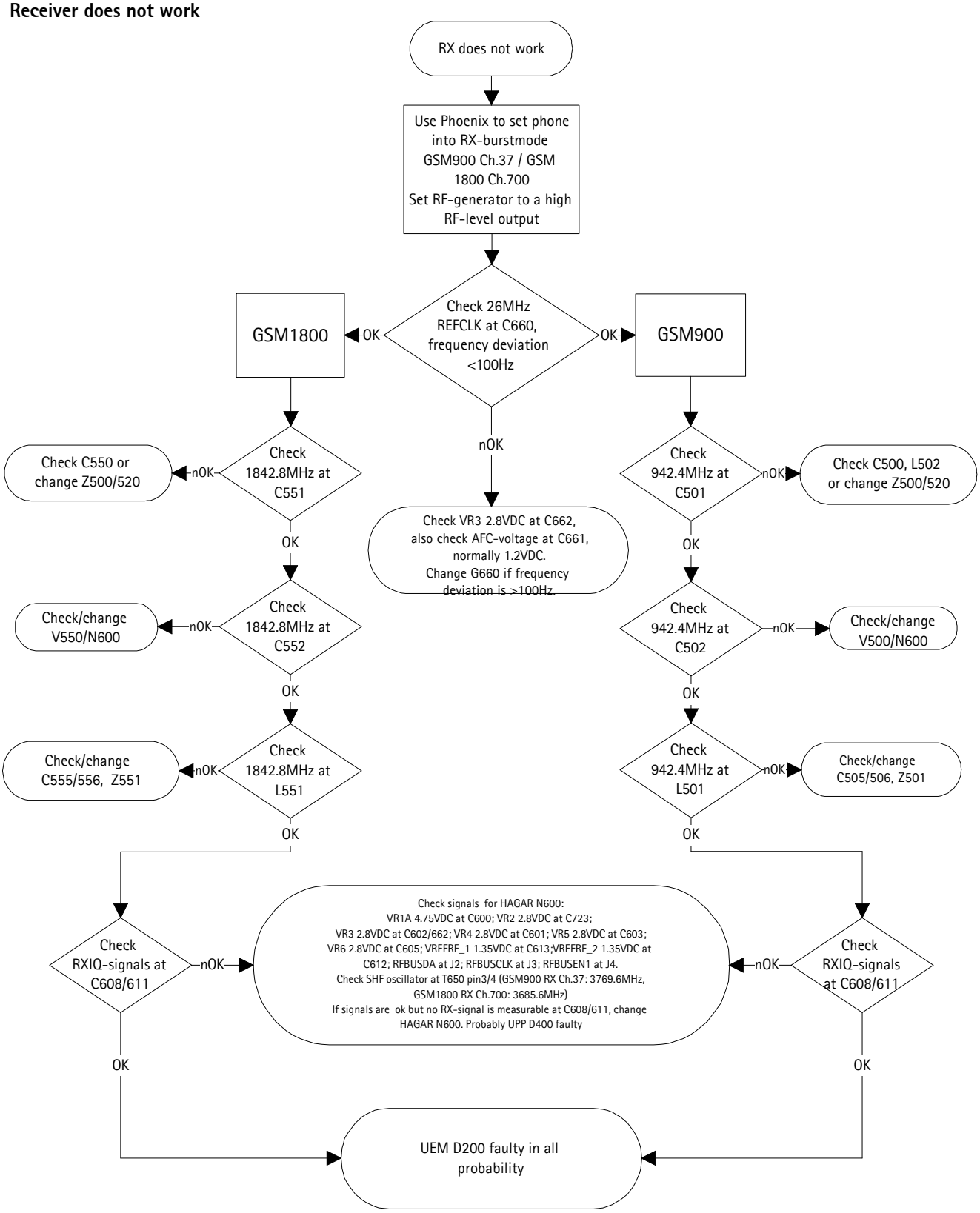
D200

- if it seems that UEM D200 is responsible for the fault because of missing TXC- or corrupted TX/IQ-signals (refer to signals shown on the top of this page), remember that you have to rewrite IMEI and SIMlock data after changing this part!

D400

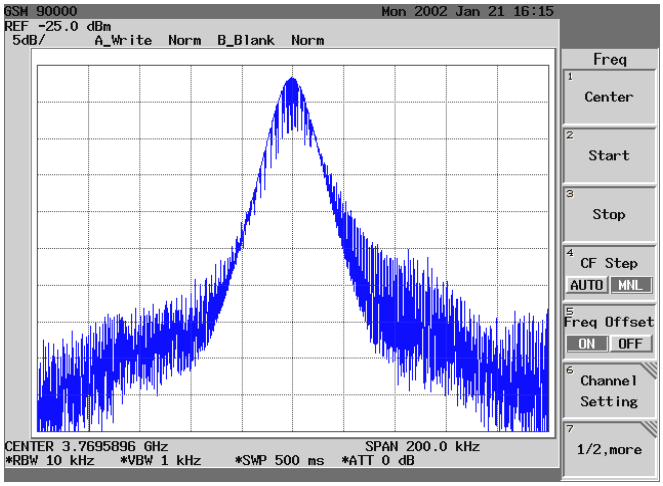
- it has been seen that in some cases UPP D400 was responsible for "No Service"-faults. Unfortunately it is not possible to check some important signals because of missing testpoints (e.g. TXP, Hagar reset). Nevertheless you can check with an oscilloscope for activity on the RFBUS (J2/3/4). If already here a signal is missing and there is no short circuit to ground on these lines, you should change D400.
  Note that it is necessary to reflash the phone after changing UPP. Otherwise the phone will not switch on.

Receiver does not work



G660
- first thing to do as in case of TX-faults is to set phone with Phoenix to local mode, activate RX-burstmode Ch.37
- check VR3 2.8VDC at C662. With only this voltage the oscillator must be able to work on a frequency of 26MHz. Otherwise you have to change G660. Signal of G660 at C660 is shown on page 14.
  AFC-voltage at C661 normally is 1.25VDC, but may vary between 0.05VDC and 2.5VDC.
  If frequency deviation of G660 is >100Hz it is necessary to change the oscillator!

G650, C653
- to check if the SHF-oscillator G650 is working you have to activate RX-burstmode Ch.37. After that check signal (3769.6MHz) at T650 pin 3 and 4 as shown below:



  If no signal is measurable at T650 check VR7 2.6VDC at C650. If OK, set span of your analyser to e.g. 250MHz to check if the oscillator works on any other frequency as on the supposed. In case of that check control voltage at C652 which normally is 3VDC on channel 37. Especially check C653 (tendency to leak) in case of noise on the control voltage.
  In case that the oscillator does not work at all, change G650 and retest the phone.

N600
- set phone with Phoenix to local mode and activate RX-burstmode Ch.37 (Ch.700 for GSM1800), set RF-generator to high RF-level output, e.g. –40dBm
- check 26MHz reference clock at C660, refer to signal shown on page 14
- check incoming RX-signal of 942.4MHz at L501 (1842.8MHz at L551)
- check VR1A 4.75VDC at C600, VR2 2.8VDC at C723, VR3 2.8VDC at C662, VR4 2.8VDC at C601, VR5 2.8VDC at C603, VR6 2.8VDC at C605 and VR7 2.8VDC at C650
- check with an oscilloscope RFBUSDA at J2, RFBUSCLK at J3 and RFBUSEN1 at J4, refer to signals shown on page 15
- check signal of SHF-oscillator at T650 pin 3 and 4 (3769.6MHz/Ch.37, 3685.6MHz/Ch.700) as shown in the picture before.

If these signals are ok but no RX I/Q-signal is measurable at C608/611, you have to change Hagar N600. Probably UPP D400 is faulty. Change part in case of doubt and retest the phone.

I010
- in case that customer complains poor receiver signal strenght but no fault can be found when module is in the service-jig, especially check mechanical condition of antenna´s spring contacts which you can find at the top of the B-cover´s inner side. These contacts must not be bent or soiled in any way, in case of doubt exchange the B-cover and retest the phone.

CHANGE HISTORY

Originator	Status	Version	Date	Comment
TS Training Group	Draft	0.1	11.02.2002	First draft version for the repair group
TS Training Group	Approved	1.0	28.02.2002	First approved release
TS Training Group	Draft	1.5	29.04.2002	Contact service part added
TS Training Group	Approved	2.0	13.05.2002	Pictures replaced